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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/917,912	07/31/2001	Masayuki Kojima	503.28546CV9	1412

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EXAMINER

ANGEBRANDT, MARTIN J

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/917,912

Applicant(s)

KOJIMA ET AL.

Examiner

Martin J Angebranndt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/8/04, 8/16/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-15, 17, 27 and 67-72 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-15, 17, 27 and 67-72 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/8/04</u> . | 6) <input type="checkbox"/> Other: _____ |

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1. The response of the applicant has been read and given careful consideration. The rejection of the previous office action are withdrawn based upon the amendments to the claims and the arguments. The issue of semi-continuous processing is interesting and somewhat persuasive. The applicant is reminded of their duty of disclosure with respect to co-pending applications directed to the same subject matter.

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 8-15, 17, 27 and 67-72 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of U.S. Patent No. 6,656,846 in view of Elliot "Integrated Circuit Fabrication Technology" ©1982, Nakamura et al. EP 0247603, Moe et al. '355, Peterman et al. '252 and Boswell '935

Elliot specifically teaches on page 273, the use of a carbon tetrafluoride plasma to preclean the wafer and harden the resist, the etching of the aluminum coated on the wafer using a carbon tetrachloride plasma to etch Al-Si, followed by a hydrogen plasma cleaning, a carbon tetrafluoride:Oxygen plasma. After this etching cycle the subsequent treatment with a wet etchant for aluminum is taught. The etching of an aluminum substrate using a carbon tetrachloride plasma:hydrogen etch, followed by a 60 second oxygen plasma passivation is

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taught on page 272. The use of strippers to remove the resist after etching using solvents is disclosed on page 273 and 274. Page 57 teaches that after wet etching, rinsing and drying is conventional for aluminum layers. The use of nitric, phosphoric and acetic acid to perform the wet etch of aluminum is taught on pages 57,256 and 257. The use of rinsing and drying steps after resist removal using solvents is taught on page 58. Also conventional rinsing and drying after either wet or dry etching is taught on page 267. The minimization of exposure to the atmosphere which allows formation of HCl which subsequently etches the aluminum.

Nakamura et al. EP 0247603 teaches the use of an etchant gas for patterning the aluminum alloy layer formed on a glass substrate masked by the resist, followed by downstream etching/stripping of the resist pattern in an oxygen containing atmosphere, where **the substrate is transferred under an inert gas atmosphere or vacuum from the first etch apparatus to the second.** (page 3/lines 27-53, hereinafter 3/27-53) The use of this process with other alloys is disclosed. (4/57-58) The avoidance of exposure to the atmosphere is specifically taught (3/44-46)

Moe et al. '355 teach the use of either heated air or nitrogen to dry the wafers after stripping and rinsing. (1/32-36 and 49-56) Please note that the chamber in which the drying takes place is the same as the rinsing chamber. (see terminology rinse-dryer housing at 4/3).

Peterman et al. '252 teach the dry etching using chlorine gas of various metallic contacts/interconnections. These include Al, Cu, Si, Ti, W, Ag, Au or alloys or **composites** of the preceding metals. (see claim 4 and 3/48-52).

Boswell '935 discloses that when using an RF bias applied to the substrate of the material being etched, the degree of the anisotropy of the etch may be controlled. The application of a

low bias results in an isotropic etch while the application of a high RMS bias voltage results in an anisotropic etch (5/57-66). The use of this technique with reactive etch species, such as carbon tetrachloride is disclosed. (6/2-13)

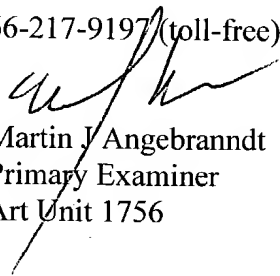
It would have been obvious to one skilled in the art to modify the process of claims 1-10 of U.S. Patent No. 6,656,846, so that the post plasma processing device is an oxygen ashing device used to remove the resist based upon the showings by Elliot "Integrated Circuit Fabrication Technology" ©1982 and Nakamura et al. EP 0247603 that this is conventional for removing the resist after the patterning etch, to apply an RF bias to the substrate during the etch process to control the anisotropy of the reactive ion etch as taught by Boswell '935, to use drying processes as taught conventional by Elliot "Integrated Circuit Fabrication Technology" ©1982 and Moe et al. '355 to prevent corrosion and to use the resultant process with electrical traces formed of composites of Al, Cu, Si, Ti, W, Ag, Au based upon the teachings of Peterman et al. '252 that these are useful and able to be dry etched.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebrannndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Martin J. Angebranndt
Primary Examiner
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10/27/2004